

Office Action Summary

Application No.

09/867,892

Applicant(s)

BEUKER ET AL.

Examiner

Patrick L Edwards

Art Unit

2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.



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09/867,892	05/30/2001	Rob Anne Beuker	TW 000002	7104

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EXAMINER

EDWARDS, PATRICK L

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 03/29/2004

7

Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: There exists several instances of grammatical errors and misspellings throughout the specification.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 3, 4, 5 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claim 3, it is not clear how a translation is determined as the average of the 2D coordinates in the image. This concept was not clearly explained in the specification.

With regard to claims 4 and 5, the phrase 'projective translation parameters' does not appear to have antecedent basis.

With regard to claim 12, which is dependent on claim 10, the claimed 'x-ray source' and 'x-ray detector' do not appear to have antecedent basis.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 1-3, 5-7, 9,10, 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schultz et al ("Multiframe integration via the projective transformation with automated block matching feature point selection") in view of Jasinski et al. (USPN 6,504,569).

With regard to claim 1, Schultz discloses selecting at least four feature points in the 3D scene (Schultz pg 3266 left column final paragraph). Schultz further discloses finding the 2D coordinate of the points in both images corresponding to the selected feature points, the 2D coordinates being found with respect to the original coordinate systems in the two images (Schultz pg 3266 left column final paragraph). Schultz further discloses determining the parameters of a substantially optimal projective transformation relating the untranslated coordinate systems of the two images (Schultz pg 3266 left column final paragraph). Schultz further discloses merging the two images by transforming one image according to the projective transformation and combining the transformed image with the other image (Schultz pg 3266 right column step 7). Schultz fails to expressly disclose translating the original coordinate systems of the two images in order to substantially minimize the average coordinate ranges of the 2D coordinates found, and determining the parameters of a substantially optimal projective transformation relating the corresponding translated coordinates in the two images.

Jasinski, however, discloses translating the coordinate system of matching feature points in order to substantially minimize the average coordinate ranges of the matching 2D coordinates (Jasinski col. 6 lines 62-67). Jasinski further discloses determining the parameters of a substantially optimal projective transformation relating the corresponding translated coordinates (Jasinski col. 6 line 67 – col. 7 line 13). The essential matrix E as disclosed in Jasinski is analogous to a projective transformation as recited in the claim. It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Schultz's image merging method by translating the coordinate system of the matched feature points before determining a projective transformation as taught by Jasinski. Such a modification would

Art Unit: 2621

have allowed for a more stable determination of the projective transformation (Jasinski col. 6 line 67 – col. 7 line 1).

With regard to claim 2, Schultz further discloses automatic selection of feature points with sufficient surrounding structure for accurate matching of the corresponding 2D coordinates in the two images (Schultz pg 3266 left column final paragraph).

With regard to claim 3, Jasinski further discloses that translating comprises determining the translation for each image as the average of the 2D coordinates in that image (Jasinski col. 6 lines 62-67). Putting the coordinate origin at the spatial center of mass of the feature points as disclosed in Jasinski is analogous to taking an average of the 2D coordinates as recited in the claim.

With regard to claim 5, Schultz discloses calculating a least squares solution for the projective transformation. A least squares solution as disclosed in Schultz qualifies as a function for minimizing error as recited in the claim.

With regard to claim 6, Schultz further discloses a means for obtaining a pair of 2D images (a camera), a processor responsive to the means for obtaining images and configured to perform the method of claim 1 (a processor is inherent in the disclosure in that the image processing computations could not be performed without a processor) and a display for viewing the pair of images merged by the processor (see Figures 1, 2 and 3)..

With regard to claim 7, Schultz further discloses a camera for capturing a digital image. Consequently the camera disclosed in Schultz qualifies as a digital camera as recited in the claim.

With regard to claim 9, Schultz discloses a camera which is coupled to a processor which performs a method. Inherent in this configuration is a network connection between the camera and the processor. The processor has to receive the image captured from the camera in order to perform processing on the image. Consequently, Schultz inherently discloses a network connection across which images are received.

Art Unit: 2621

With regard to claim 10, a computer-readable recording medium that stores a program which causes the computer to execute the steps of a method is essential if the image processing method disclosed in Schultz is to function. Therefore, a computer-readable recording medium is inherent in the teachings of Schultz.

With regard to claim 13, a computer-readable recording medium that stores a program which causes the computer to execute the steps of a method is essential if the image processing method disclosed in Schultz is to function. Therefore, a computer-readable recording medium is inherent in the teachings of Schultz.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Schultz and Jasinski as applied to claim 1 above, and further in view of well known prior art.

With regard to claim 4, Schultz discloses determining the projective transformation parameters through the use of a matrix operation. Claim 4 recites determining these parameters by performing a singular value decomposition. Singular value decomposition is well known in the art (Official Notice) as a method for solving a matrix. It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Schultz's transformation parameter determination by specifying that the matrix operation was solved by a method of singular value decomposition. Such a modification would have allowed for a well known method of solving a matrix.

7. Claims 8, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Schultz and Jasinski as applied to claims 1 and 6 above, and further in view of Lobregt et al. (USPN 6,078,699).

Art Unit: 2621

With regard to claim 8, the combination of Schultz and Jasinski fails to expressly disclose an x-ray apparatus as a means for obtaining images. Lobregt, however, discloses an image merging apparatus which is an x-ray apparatus (Lobregt Figure 1).

It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Schultz and Jasinski's image merging apparatus by performing the operation in an x-ray environment as taught by Lobregt. Such a modification would have allowed for the image merging method to be applied in a useful medical application.

With regard to claim 11, Lobregt further discloses an x-ray source for projecting a beam of x-rays through an object to be examined, an x-ray detector for obtaining digital x-ray images which are projections of the object, a processor responsive to pairs of overlapping x-ray images obtained by the x-ray detector and configured to perform an image merging method, and a display for viewing the the pair of images merged by the processor (Lobregt Figure 1).

With regard to claim 12, Lobregt further discloses a means for jointly moving the x-ray source and the x-ray detector for rotation about at least one axis or motion along at least one direction (Lobregt Figure 1 element 6).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick L Edwards whose telephone number is (703) 305-6301. The examiner can normally be reached on 8:30am - 5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

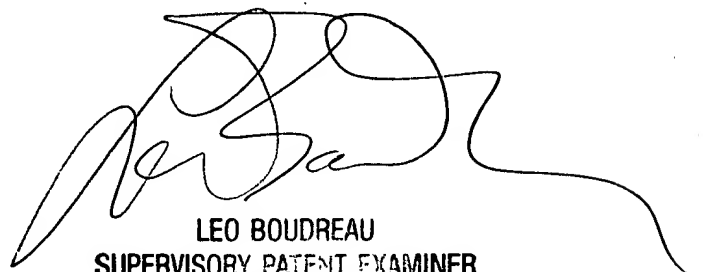
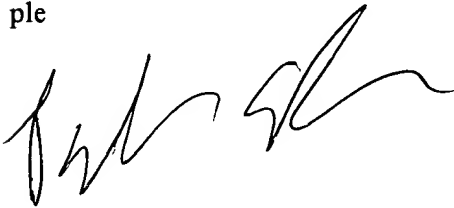
Art Unit: 2621

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Patrick Lynn Edwards

Art Unit 2621

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